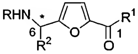
Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An unnatural chiral furan amino ~~acids~~ acid carrying natural amino acid side-chains at C6-position and having a general structure **1** as shown in Formula 1



1

Formula 1

* (Stereochemistry of C6 is either *R* or *S*)

Wherein;

R = H, tert-butoxycarbonyl (Boc), benzyloxycarbonyl (Cbz), 9-fluorenylmethyl (Fmoc), acetyl, or salts such as HCl, or $CF_3COOH.H$ ~~and others~~;

R^1 = -OH, -O-alkyl, -O-arylalkyl, -amine, -alkylamine, or -arylalkylamine~~, and others~~;

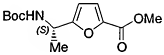
R^2 = CH_3-, $(CH_3)_2CH$-, $(CH_3)_2CHCH_2$-, $CH_3CH_2CH(CH_3)$-, alkyl groups; $(OR^3)CH_2$-, $CH_3(OR^3)CH$-, $(R^3S)CH_2$-, $CH_3SCH_2CH_2$-, $(RHN)CH_2CH_2CH_2CH_2$-; $(CONH_2)CH_2$-, $(CONH_2)CH_2CH_2$-, $(CO_2R^4)CH_2$-, $(CO_2R^4)CH_2CH_2$-, Ph-, Ar-; $PhCH_2$-, $ArCH_2$-, Phenylalkyl-, arylalkyl-, (indolyl)CH_2-, or (imidazolyl)CH_2-~~, and all other amino acid side-chains~~;

R^3 = H, *tert*-butyl, alkyl, benzyl, arylCH_2, CO(alkyl), CO(arylalkyl), SO_3H, PO_3H_2, silyl or ~~and others~~;

R^4 = H, *tert*-butyl, alkyl, benzyl, or arylCH_2~~, and others~~; or

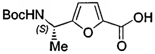
R-R^2 = $-(CH_2)_n-$ (n = 2, 3, 4...).

2. (Previously Presented) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OMe, R^2 = Me and R = Boc having a structural formula **2** shown here below



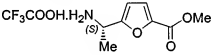
2

3. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OH, R^2 = Me and R = Boc having a structural formula **3** shown here below



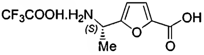
3

4. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OMe, R^2 = Me and R = $CF_3COOH.H$ having a structural formula **4** shown here below



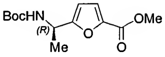
4

5. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OH, R^2 = Me and R = $CF_3COOH.H$ having a structural formula **5** shown here below



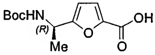
5

6. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OMe, R^2 = Me and R = Boc having a structural formula **6** shown here below



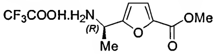
6

7. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OH, R^2 = Me and R = Boc having a structural formula **7** shown here below



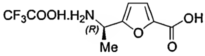
7

8. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OMe, R^2 = Me and R = $CF_3COOH.H$ having a structural formula **8** shown here below



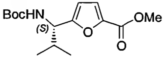
8

9. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OH, R^2 = Me and R = $CF_3COOH.H$ having a structural formula **9** shown here below

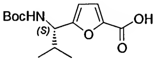


9

10. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OMe, R^2 = $CHMe_2$ and R = Boc having a structural formula **10** shown here below

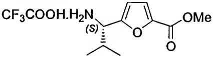


11. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OH, R^2 = $CHMe_2$ and R = Boc having a structural formula **11** shown here below



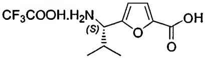
11

12. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OMe, R^2 = $CHMe_2$ and R = $CF_3COOH.H$ having a structural formula **12** shown here below



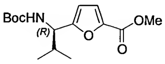
12

13. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OH, R^2 = $CHMe_2$ and R = $CF_3COOH.H$ having a structural formula **13** shown here below



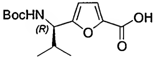
13

14. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OMe, R^2 = $CHMe_2$ and R = Boc having a structural formula **14** shown here below



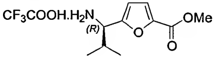
14

15. (Original) A chiral furan amino acid as claimed in claim 1, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OH, R^2 = $CHMe_2$ and R = Boc having a structural formula **15** shown here below



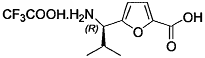
15

16. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OMe, R^2 = $CHMe_2$ and R = $CF_3COOH.H$ having a structural formula **16** shown here below



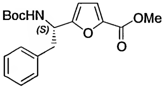
16

17. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OH, R^2 = $CHMe_2$ and R = $CF_3COOH.H$ having a structural formula **17** shown here below



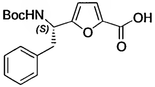
17

18. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 48, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OMe, R^2 = CH_2Ph and R = Boc having a structural formula **18** shown here below



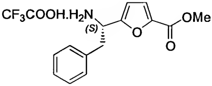
18

19. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 48, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OH, R^2 = CH_2Ph and R = Boc having a structural formula **19** shown here below



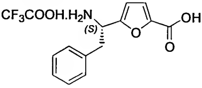
19

20. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OMe, R^2 = CH_2Ph and R = CF_3COOH.H having a structural formula **20** shown here below



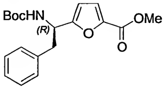
20

21. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *S* and the substitutions are R^1 = OH, R^2 = CH_2Ph and R = CF_3COOH.H having a structural formula **21** shown here below



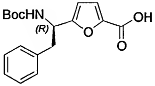
21

22. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 48, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OMe, R^2 = CH_2Ph and R = Boc having a structural formula **22** shown here below



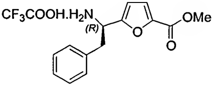
22

23. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 48, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OH, R^2 = CH_2Ph and R = Boc having a structural formula **23** shown here below



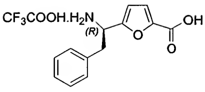
23

24. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OMe, R^2 = CH_2Ph and R = $CF_3COOH.H$ having a structural formula **24** shown here below



24

25. (Currently Amended) A chiral furan amino acid as claimed in claim ~~1~~ 49, wherein if the stereochemistry of C6 is *R* and the substitutions are R^1 = OH, R^2 = CH_2Ph and R = $CF_3COOH.H$ having a structural formula **25** shown here below



25

26. (Currently Amended) A ~~process~~ chiral furan amino acid as claimed in claim 1, wherein if structure **1** ~~with substitution~~ has the substitutions R = Boc, R^1 = OH, R^2 = Me and 6*S* stereochemistry, the chiral furan has the following characteristics: R_f = 0.45 (silica, 1:9 MeOH/$CHCl_3$ with 1% AcOH); $[\alpha]_D^{23}$ = –52.8 (*c* 1.14, MeOH); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.17 (br d, *J* = 2.2 Hz, 1 H, aromatic), 6.29 (d, *J* = 2.2 Hz, 1 H, aromatic), 5.04 (br m, 1 H, N*H*), 4.93 (br m, 1 H, C*H*NH), 1.48 (d, *J* = 6.59 Hz, 3 H, CH3), and 1.42 (s, 9 H, *t*-butyl) ~~and yield up to 98%~~.

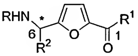
27. (Currently Amended) A ~~process~~ chiral furan amino acid as claimed in claim 1, wherein if structure **1** ~~with substitution~~ has the substitutions R = Boc, R^1 = OH, R^2 = $CHMe_2$ and 6*S* stereochemistry, the chiral furan has the following characteristics: R_f = 0.5 (silica, 1:9 MeOH/$CHCl_3$ with 1% AcOH); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.18 (br 1 H, one of the furan ring protons), 6.39 (br, 1 H, one of the furan ring protons), 5.09 (br, 1 H, N*H*), 4.61 (br, 1 H, C*H*NH), 2.2 (m, 1 H, C*H*$(CH_3)_2$), 1.42 (s, 9 H, *t*-butyl), 0.95 (d, *J* = 6.69 Hz, 3 H, CH_3), and 0.89 (d, *J* = 6.69 Hz, 3 H, CH_3) ~~and yield up to 88%~~.

28. (Currently Amended) A ~~process~~ chiral furan amino acid as claimed in claim 1, wherein if structure **1** ~~with substitution~~ has the substitutions R = Boc, R^1 = OH, R^2 = CH_2Ph and 6*S* stereochemistry, the chiral furan has the following characteristics: R_f = 0.5 (silica, 10 MeOH/$CHCl_3$ with 1% AcOH); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.18 (m, 5 H, aromatic protons), 7.05 (br, 1 H, one of the furan ring protons), 6.12 (br, 1 H, one of the furan ring protons), 5.03 (m, 2 H, N*H* & C*H*NH), 3.16 (m, 2 H, CH_2Ph), and 1.39 (s, 9 H, *t*-butyl) ~~and yield up to 92%~~.

29. (Currently Amended) A ~~process~~ chiral furan amino acid as claimed in claim 1, wherein if structure **1** ~~with substitution~~ has the substitutions R = Boc, R^1 = OH, R^2 = Ph and 6*S* stereochemistry, the chiral furan has the following characteristics: R_f = 0.5 (silica, 10% MeOH/$CHCl_3$ with 1% AcOH); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.29 (m, 5 H, aromatic protons), 7.15 (br, 1 H, one of the furan ring protons), 6.21 (br, 1 H, one of the furan ring protons), 5.85 (br, 1 H, C*H*NH), 5.43 (br, 1 H, N*H*), and 1.44 (s, 9 H, *t*-butyl) ~~and yield up to 90%~~.

30. (Currently Amended) A chiral furan amino acids as claimed in claims 5, 9, 13, 17, 21 or 25, wherein *N*-Fmoc-protected furan amino acid is obtained by treatment of structures 5, 9, 13, 17, 21, or 25 with FmocOSu in dioxane-water in the ration of 1:1.

31. (Withdrawn) A process for preparing unnatural chiral furan amino acids carrying natural amino acid side-chains in C6-position and having a general structure as shown in structure **1**



1

* (Stereochemistry of C6 is either *R* or *S*)

Wherein; R = H, Boc, Cbz, Fmoc, acetyl or salts such as HCl.H, CF_3COOH.H and others;

R^1 = -OH, -O-alkyl, -O-arylalkyl, -amine, -alkylamine, -arylalkylamine, and others;

R^2 = CH_3-, $(CH_3)_2CH$-, $(CH_3)_2CHCH_2$-, $CH_3CH_2CH(CH_3)$-, alkyl groups; $(OR^3)CH_2$-, $CH_3(OR^3)CH$-, $(R^3S)CH_2$-, $CH_3SCH_2CH_2$-, $(RHN)CH_2CH_2CH_2CH_2$-; $(CONH_2)CH_2$-, $(CONH_2)CH_2CH_2$-, $(CO_2R^4)CH_2$-, $(CO_2R^4)CH_2CH_2$-, Ph-, Ar-; $PhCH_2$-, $ArCH_2$-, Phenylalkyl-, arylalkyl-, (indolyl)CH_2-, (imidazolyl)CH_2-, and all other amino acid side-chains;

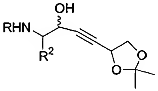
R^3 = H, *tert*-butyl, alkyl, benzyl, arylCH_2, CO(alkyl), CO(arylalkyl), SO_3H, PO_3H_2, silyl and others;

R^4 = H, *tert*-butyl, alkyl, benzyl, arylCH_2, and others;

R-R^2 = - $(CH_2)_n$- (n = 2, 3, 4...);

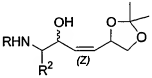
said process comprising the steps of:

a) addition of Li-acetylide, prepared *in-situ* by reacting 3,4-*O*-isopropylidene-1,1-dibromobut-1-en-3,4-diol **3** with n-BuLi, to the chiral *N*-protected amino aldehyde **2** to obtain the propargyl alcohol adduct **4** as a mixture of isomers having the structure



4
propargyl alcohol
adduct

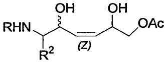
b) selective hydrogenation of the acetylenic moiety to a *cis* double bond using P2-Ni to get the *cis*-allylic alcohol intermediate **5** having the structure



5
cis-allylic alcohol
intermediate

c) treating **5** with acid to deprotect the acetonide and to furnish an intermediate triol

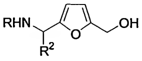
d) selective acylation of the primary hydroxyl group of the triol from of step (c) to obtain the "*cis*-2-butene-1,4-diol" intermediate **6** having the structure



6
"*cis*-2-butene-1,4-diol"
intermediate

e) oxidation of the "*cis*-2-butene-1,4-diol" intermediate **6** using pyridinium chlorochromate (PCC) to construct the furan ring

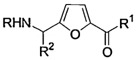
f) deprotection of the intermediate acetate from step (e) in presence of anhydrous K_2CO_3 to obtain the chiral furanyl alcohol intermediate **7** having the structure



7
chiral furanyl alcohol intermediate

g) oxidation of the primary hydroxyl of the chiral furanyl alcohol intermediate **7** using Swern oxidation process or SO_3-py complex to obtain an aldehyde

h) oxidation of the aldehyde intermediate from step (g) using $NaClO_2$-H_2O_2 to obtain the desired acid **1** (R^1 = OH) having the structure



1
Chiral furan amino acid

i) transformation of the acid from step (h) into (a) an ester (i) on treatment with CH_2N_2 in ether (**1**: R^1 = OMe), or (ii) an alcohol in the presence of acid (**1**: R^1 = O-alkyl etc.); (b) an amide on treatment with an amine in presence of DCC and HOBt (**1**: R^1 = -amine, -alkylamine, -arylalkylamine).

32. (Withdrawn) A process as claimed in claim 31 wherein in step (a), if the structure **4** with substitution R = Boc, R^2 = Me and 6*S* stereochemistry, has the following characteristics: R_f = 0.5 (silica, 2:3 ethyl acetate/hexane); ^{1}H NMR (300 MHz, $CDCl_3$) δ 4.73-4.68 (ddd, *J* = 6.04, 3.78, 1.51 Hz, 1 H, C*H*OH), 4.65- 4.62 (d, *J* = 8.31 Hz, 1 H, N*H*), 4.36-4.32 (ddd, *J* = 6.79, 5.29, 1.51 Hz, 1 H, C*H*CH_2), 4.15-4.09 (dd, *J* = 6.79, 6.04 Hz, 1 H, one of the CH_2 protons), 3.91-3.86 (dd, *J* = 6.04, 5.29 Hz, 1 H, one of the CH_2 protons), 3.83- 3.76 (m, 1 H, C*H*NH), 2.89 (bs, 1 H, O*H*), 1.45 (s, 3 H, acetonide methyl protons), 1.442 (s, 9 H, *t*-butyl protons),

1.354 (s, 3 H, acetonide methyl protons), 1.247-1.225 (d, J = 6.79 Hz, 3 H, CH_3) and yield up to 60 %.

33. (Withdrawn) A process as claimed in claim 31 wherein in step (a), if the structure **4** with substitution R = Boc, R^2 = $CHMe_2$ and 6*S* stereochemistry, has the following characteristics: R_f = 0.5 (silica, 40% EtOAc / Hexane); ^{1}H NMR (300 MHz, $CDCl_3$) δ 4.7 (m, 1 H, C*H*OH), 4.59 (d, J = 9.07 Hz, 1 H, N*H*), 4.12 (m, 1 H, C*H*CH_2), 3.88 (m, 2 H, CH_2), 3.54 (m, 1 H, C*H*NH), 1.78 (m, 1 H, C*H*$(CH_3)_2$), 1.46 (s, 9 H, *t*-butyl), 1.45 (s, 6 H, acetonide protons), 0.99 (d, J = 6.8 Hz, 6 H, CH_3) and yield up to 63%.

34. (Withdrawn) A process as claimed in claim 31 wherein in step (a), if the structure **4** with substitution R = Boc, R^2 = CH_2Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 40% EtOAc/Hexane); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.23 (m, 5 H, aromatic protons), 4.82-4.65 (m, 2 H, C*H*OH & N*H*), 4.37 (br, 1 H, C*H*NH), 4.19-4.06 (m, 2 H, C*H* & one of the CH_2), 3.9 (m, 1 H, one of the CH_2), 2.91 (m, 2 H, CH_2Ph), 1.39-1.38 (m, 15 H, *t*-butyl & acetonide methyls) and yield up to 65%.

35. (Withdrawn) A process as claimed in claim 31 wherein in step (a), if the structure **4** with substitution R = Boc, R^2 = Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 40% EtOAc/Hexane); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.29 (m, 5 H, aromatic protons), 5.27-5.18 (m, 2 H, C*H*OH & N*H*), 5 (m, 1 H, C*H*NH), 4.94 (m, 1 H, C*H*), 4.03 (m, 2 H, CH_2), 1.44 (s, 9 H, *t*-butyl), 1.41 (s, 6 H, acetonide methyls) and yield up to 62%.

36. (Withdrawn) A process as claimed in claim 31 wherein in step (b), if the structure **5** with substitution R = Boc, R^2 = Me and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 2:3 ethyl acetate/hexane); ^{1}H NMR (200 MHz, $CDCl_3$) δ 5.62-5.55 (m, 2 H, olefinic protons), 4.92-4.68 (m, 2 H, C*H*OH), 4.36-

4.27 (bs, 1 H, N*H*), 4.15-4.05 (m, 2 H, CH_2OH), 3.71-3.61 (m, 1 H, C*H*), 3.06 (bs, 1 H, O*H*), 1.44 (s, 9 H, *t*-butyl protons), 1.40 (s, 3 H, acetonide methyl protons), 1.36 (s, 3 H, acetonide methyl protons), 1.18- 1.15 (d, J = 6.69 Hz, 3 H, methyl protons) and yield up to 70%.

37. (Withdrawn) A process as claimed in claim 31 wherein in step (b), if the structure **5** with substitution R = Boc, R^2 = $CHMe_2$ and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 30% EtOAc /Hexane); ^{1}H NMR (300 MHz, $CDCl_3$) δ 5.65 (m, 1 H, olefinic proton), 5.54 (m, 1 H, olefinic proton), 4.71 (bs, 1 H, N*H*), 4.5 (m, 1 H, C*H*OH), 4.09 (m, 1 H, C*H*), 3.55 (m, 2 H, CH_2), 3.24 (m, 1 H, C*H*NH), 1.94 (m, 1 H, $CH(CH_3)_2$), 1.44 (s, 9 H, *t*-butyl), 1.43 (s, 6 H, acetonide methyls), 1.0 (d, J = 6.8 Hz, 3 H, CH_3), 0.93 (d, J = 6.8 Hz, 3 H, CH_3) and yield up to 60%.

38. (Withdrawn) A process as claimed in claim 31 wherein in step (b) if the structure **5** with substitution R = Boc, R^2 = CH_2Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 40% EtOAc/Hexane); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.21 (m, 5 H, aromatic protons), 5.82-5.55 (m, 2 H, olefinic protins), 4.78 (m, 1 H, N*H*), 4.62-4.34 (m, 2 H, C*H*OH & C*H*), 4.06 (m, 1 H, C*H*NH), 3.51 (m, 2 H, CH_2), 2.85 (m, 2 H, CH_2Ph), 1.39-1.32 (m, 15 H, *t*-butyl & acetonide methyls) and yield up to 65%.

39. (Withdrawn) A process as claimed in claim 31 wherein in step (b), if the structure **5** with substitution R = Boc, R^2 = Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 40% EtOAc/hexane); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.25 (m, 5 H, aromatic protons), 5.87-5.55 (m, 2 H, olefinic protons), 5.25 (m, 2 H, C*H*OH, N*H*), 4.99 (m, 1 H, C*H*NH), 4.58 (m, 1 H, C*H*), 3.90 (m, 2 H, CH_2), 1.44 (s, 9 H, *t*-butyl), 1.41 (s, 6 H, acetonide methyls) and yield up to 70%.

40. (Withdrawn) A process as claimed in claim 31 wherein in step (d), if the structure **6** with substitution R = Boc, R^2 = Me and 6*S* stereochemistry, has the following characteristics: R_f = 0.6 (silica, 1:9 methanol/chloroform); ^{1}H NMR (200 MHz,

$CDCl_3$) δ 5.66-5.46 (two dd, J = 11.89, 6.69 Hz, 2 H, olefinic protons), 4.90-4.85 (d, J = 8.92 Hz, 1 H, N*H*), 4.66-4.59 (dt, J = 6.69, 4.46 Hz, 1 H, C*H*OH), 4.41-4.36 (ddd, J = 6.69, 5.02, 4.46 Hz, 1 H, C*H*OH), 4.16-3.98 (two dd, J = 11.15, 6.69 and 11.15, 4.46 Hz, 2 H, CH_2OAc), 2.09 (s, 3 H, CH_3CO), 1.44 (s, 9 H, *t*-butyl), 1.20- 1.17 (d, J = 6.69 Hz, 3 H, CH_3) and yield up to 93%.

41. (Withdrawn) A process as claimed in claim 31 wherein in step (d), if the structure **6** with substitution R = Boc, R^2 = $CHMe_2$ and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 10% MeOH/$CHCl_3$); ^{1}H NMR (300 MHz, $CDCl_3$) δ 5.66 (dd, J = 11.33, 7.93 Hz, 1 H, olefinic proton), 5.54 (dd, J = 11.33, 8.31 Hz, 1 H, olefinic proton), 4.72-4.67 (m, 1 H, C*H*OH), 4.4 (dd, J = 7.93, 6.8 Hz, 1 H, C*H*), 4.18 (dd, J = 11.33, 3.4 Hz, 1 H one of the CH_2), 3.93 (dd, J = 11.33, 7.55 Hz, 1 H, one of the CH_2), 2.1 (s, 3 H, COCH_3), 2 (m, 1 H, C*H*$(CH_3)_2$), 1.42 (s, 9 H, *t*-butyl), 0.97 (d, J = 6.8 Hz, 3 H, CH_3), 0.92 (d, J = 6.8 Hz, 3 H, CH_3) and yield up to 80%.

42. (Withdrawn) A process as claimed in claim 31 wherein in step (d), if the structure **6** with substitution R = Boc, R^2 = CH_2Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 10% MeOH/$CHCl_3$); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.21 (m, 5 H, aromatic protons), 5.68-5.45 (m, 2 H, olefinic protons), 4.65 (m, 2 H, C*H*OH & N*H*), 4.45 (m, 1 H, C*H*OH), 4.05 (m, 2 H, CH_2), 3.8 (m, 1 H, C*H*NH), 2.85 (m, 2 H, CH_2Ph), 2.04 (s, 3 H, COCH_3), 1.25 (m, 15 H, *t*-butyl) and yield up to 90%.

43. (Withdrawn) A process as claimed in claim 31 wherein in step (d), if the structure **6** with substitution R = Boc, R^2 = Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 10% MeOH/$CHCl_3$); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.29 (m, 5 H, aromatic protons), 5.87-5.55 (m, 2 H, olefinic protons), 5.25 (m, 2 H, C*H*OH & N*H*), 4.85 (m, 1 H, C*H*NH), 4.61 (m, 1 H, C*H*OH), 4.21 (m, 2 H, CH_2), 2.1 (s, 3 H, COCH_3), 1.44 (s, 9 H, *t*-butyl) and yield up to 85%.

44. (Withdrawn) A process as claimed in claim 31 wherein in step (f), if the structure 7 with substitution R = Boc, R^2 = Me and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 1:1 ethyl acetate/hexane); $[\alpha]_D^{23}$ = –59.9 (*c* 1.76, $CHCl_3$); ^{1}H NMR (200 MHz, $CDCl_3$) δ 6.17-6.14 (d, *J* = 2.97 Hz, 1 H, one of the ring protons), 6.08-6.04 (d, *J* = 2.97 Hz, 1 H, one of the ring protons), 4.86-4.71 (bs, 2 H, N*H* and C*H*), 4.52 (s, 2 H, CH_2OH), 2.14- 1.93 (bs, 1 H, O*H*) 1.48- 1.43 (s,12 H, *t*-butyl group and methyl protons) and yield up to 98%.

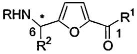
45. (Withdrawn) A process as claimed in claim 31 wherein in step (f), if the structure 7 with substitution R = Boc, R^2 = $CHMe_2$ and 6*S* stereochemistry, has the following characteristics: R_f = 0.5 (silica, 30% EtOAc/Hexane); $[\alpha]_D^{23}$ = –59.9 (*c* 1.76, $CHCl_3$); ^{1}H NMR (300 MHz, $CDCl_3$) δ 6.16 (d, *J* = 2.93 Hz, 1 H, one of the furan ring protons), 6.06 (d, *J* = 2.93 Hz, 1 H, one of the furan ring protons), 4.84 (d, *J* = 8.79 Hz, 1 H, N*H*), 4.53 (s, 2 H, CH_2OH), 4.52 (m, 1 H, C*H*NH) 2.09 (m, 1 H, C*H*(CH_3)$_2$), 1.44 (s, 9 H, *t*-butyl), 0.94 (d, , *J* = 6.59 Hz, 3 H, CH_3), 0.88 (d, , *J* = 6.59 Hz, 3 H, CH_3) and yield up to 95%.

46. (Withdrawn) A process as claimed in claim 31 wherein in step (f), if the structure 7 with substitution R = Boc, R^2 = CH_2Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.5 (silica, 40% EtOAc/hexane); ^{1}H NMR (200 MHz, $CDCl_3$) δ 7.2 (m, 3 H, aromatic protons), 7.02 (m, 2 H, aromatic protons), 6.12 (d, *J* = 2.97 Hz, 1 H, one of the furan ring protons), 5.93 (d, *J* = 2.97 Hz, 1 H, one of the furan ring protons), 4.94 (m, 1 H, C*H*NH), 4.81 (d, *J* = 8.92 Hz, 1 H, N*H*), 4.53 (s, 2 H, CH_2OH), 3.09 (d, *J* = 6.69 Hz, 2 H, CH_2Ph), 1.39 (s, 9 H, *t*-butyl) and yield up to 96%.

47. (Withdrawn) A process as claimed in claim 31 wherein in step (f), if the structure 7 with substitution R = Boc, R^2 = Ph and 6*S* stereochemistry, has the following characteristics: R_f = 0.45 (silica, 40% EtOAc/Hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29 (m, 5 H, aromatic protons), 6.16 (d, *J* = 3.05 Hz, 1 H, one of the

furan ring protons), 6.02 (d, J = 3.05 Hz, 1 H, one of the furan ring protons), 5.87 (br, 1 H, N*H*), 5.25 (d, J = 8.52 Hz, 1 H, C*H*NH), 4.51 (s, 2 H, CH_2OH), 1.44 (s, 9 H, *t*-butyl) and yield up to 95%.

48. (New) An unnatural chiral furan amino acid carrying natural amino acid side-chains at C6-position and having a general structure **1** as shown in Formula 1



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Formula 1

* (Stereochemistry of C6 is either *R* or *S*)

Wherein;

R = H, tert-butoxycarbonyl (Boc), benzyloxycarbonyl (Cbz), 9-fluorenylmethyl (Fmoc), acetyl, or salts such as HCl, or $CF_3COOH.H$;

R^1 = -OH, -O-alkyl, -O-arylalkyl, -amine, -alkylamine, or -arylalkylamine;

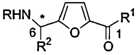
R^2 = $(OR^3)CH_2$-, $CH_3(OR^3)CH$-, $(R^3S)CH_2$-, $CH_3SCH_2CH_2$-, $(RHN)CH_2CH_2CH_2CH_2$-; $(CONH_2)CH_2$-, $(CONH_2)CH_2CH_2$-, $(CO_2R^4)CH_2$-, $(CO_2R^4)CH_2CH_2$-, Ph-, Ar-; $PhCH_2$-, $ArCH_2$-, Phenylalkyl-, arylalkyl-, (indolyl)CH_2-, or (imidazolyl)CH_2-;

R^3 = H, *tert*-butyl, alkyl, benzyl, arylCH_2, CO(alkyl), CO(arylalkyl), SO_3H, PO_3H_2, or silyl;

R^4 = H, *tert*-butyl, alkyl, benzyl, or arylCH_2; or

R-R^2 = $-(CH_2)_n-$ (n = 2, 3, 4...).

49. (New) An unnatural chiral furan amino acids carrying natural amino acid side-chains at C6-position and having a general structure **1** as shown in Formula 1



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Formula 1

* (Stereochemistry of C6 is either *R* or *S*)

Wherein;

R = $CF_3COOH.H$;

R^1 = -OH, -O-alkyl, -O-arylalkyl, -amine, -alkylamine, or -arylalkylamine;

R^2 = CH_3-, $(CH_3)_2CH$-, $(CH_3)_2CHCH_2$-, $CH_3CH_2CH(CH_3)$-, alkyl groups; $(OR^3)CH_2$-, $CH_3(OR^3)CH$-, $(R^3S)CH_2$-, $CH_3SCH_2CH_2$-, $(RHN)CH_2CH_2CH_2CH_2$-; $(CONH_2)CH_2$-, $(CONH_2)CH_2CH_2$-, $(CO_2R^4)CH_2$-, $(CO_2R^4)CH_2CH_2$-, Ph-, Ar-; $PhCH_2$-, $ArCH_2$-, Phenylalkyl-, arylalkyl-, (indolyl)CH_2-, or (imidazolyl)CH_2-;

R^3 = H, *tert*-butyl, alkyl, benzyl, arylCH_2, CO(alkyl), CO(arylalkyl), SO_3H, PO_3H_2, or silyl; and

R^4 = H, *tert*-butyl, alkyl, benzyl, or arylCH_2.